NEVADA COOPERATIVE SNOW SURVEYS

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Part II. Humboldt River Basins Eastern and Southern Nevada, and Nevada National Wildlife Refuges.

Seasonal Snow Survey and Kindred Data, with Forecast of Stream Flow
March 1, 1945

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Issued in cooperation with the Nevada Agricultural Experiment Station, United States Division of Irrigation of the Soil Conservation Service, Forest Service, Bureau of Reclamation, Weather Bureau, Geological Survey, Fish and Wildlife Service, Humboldt River Water Users, Nevada State Engineer, and Elko-Lamoille Power Company, and Wells Power Company.

Nevada Agricultural Experiment Station

Reno, Nevada

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FORECAST SUMMARY OF STREAMFLOW

March 1, 1945

1. Humboldt Basins

The snow cover percentages March 1 of 77.6 and 88.0 on the northern and southern feeders of the upper Humboldt and 94.9 on the Little Humboldt should be realized in a similar flow in their respective basins.

In the Reese River Basin the snow cover appears to be heavier possibly by 20 percent than in 1944 and the winter precipitation at Austin was 103.3 percent or 5 percent of normal greater than last year.

At Palisade, whose measurements are affected by the water table in Lamoille and Humboldt Valleys, the average flow of 82.8 percent for the joint feeders should even be exceeded by 10 to 15 percent of normal if rains during runoff are normal.

The normal flow at Palisade March-July is 215,000 A.F. or adjusted median 203,300 A. F. On the basis of 93 percent, a runoff of 200,000 (189,000) A. F. should be realized, which approximates the normal need.

At 95 percent of normal, Martin Creek in the Little Humboldt should flow 20,300 A.F.

2. Eastern Nevada

The winter precipitation at Ely is 82.2 percent of normal or 17 percent of normal better than last year but the snow cover in Steptoe Valley and Baker Creek Basin is 12 percent less than a year ago.

3. Southern Nevada

The winter precipitation at Las Vegas Airport was only 52.2 percent of normal but the snow cover shows an average increase of 8 percent over last year.

4. Wildlife Refuges

The snow cover in Sheldon Antelope Refuge in northern Washoe County is practically identical in amount with last year, though packed to half the depth.

In Ruby Lake Refuge in Elko County, the water content of the snow is practically the same as in 1943 and the winter precipitation at Arthur 95.3 percent.

The main forecast for the year will be made April 1.

GAINS IN FORECASTING AND NEEDS

1. Stream Gages

Stream gaging has now been expanded until the runoff of the Humboldt below all of the principal tributaries except above Deeth is now being exactly determined. If at all feasible, stations should be established on the main stream at Deeth and at the outlet of Lamoille Creek.

Recorders have been maintained at the canyon throats of Starr, Secret, Lamoille Creeks and South Fork to determine the relationship of the snow cover to the runoff above diversions and on lower Marys River and North Fork.

Gages are planned for Susie and Maggie Creeks to determine the possible source of the increased flow noted in the Humboldt between Moleen Canyon and Palisade. The long planned and essential gage at the canyon throat of Marys River will be definitely established this year. The counter-effect of heavy initial water supply and impeded flow should be studied with a view to increasing the net water supply of the Humboldt.

2. Well Measurements

The system of well measurements, found even more promising this past year in modifying the snow cover and runoff percentage at Palisade, has been expanded to include 8 wells in the Humboldt Valley and 15 wells in Lamoille Valley, measured monthly. These are divided for compariosn into deep and shallow wells the better to study their seasonal fluctuation. The trend of the minimum level is particularly being studied.

Snow Courses

Owing to State concentration on the search for new water sources, particularly in ground water, new snow courses are being planned on the west face of Mount Charleston overlooking Pahrump Valley and in the White Mountains.

The alternate snow course in 76 Creek adjoining upper Marys River on the west and the series of courses in Pole Creek Basin east of Marys River should be laid out without delay.

3. Safety

Survey crews are being increased to at least 3 each but distance and storm such as occurred at the time of the March 1 snow survey make the construction of additional shelter cabins imperative.

A snowmobile, like the Tucker Sno-Cat, would have made possible the erection of a high level seasonal precipitation gage on Mount Charleston this past autumn and the laying out of the snow course on the west face of Mount Charleston, failed by storm and exhaustion.

Ultimately an autogiro or helicopter will transport surveyors high above avalanches to the sources of the snow. Avalanche

restlessness has been noted this season in both the Sierra Nevada and Ruby Mountains. In the latter, in Lamoille Canyon a snow slide ruined the snow course at 8,500 ft. and some of the precipitation gages on the Terrace there.

4. Personnel

The Forest Service has been badly drained of its man power and but few civilians are available for the more remote tasks. However, men of earlier experience in the snow surveys have in several cases returned for the emergency work.

The U. S. Division of Irrigation will place a helper in snow surveying in Nevada and Arizona and the U. S. Weather Bureau is expanding its net work of seasonal and recording precipitation gages over the State.

5. Increase in State Appropriation

Through the generous approval of Governor Carville and vote of the Legislature, the State appropriation for snow-surveying for the biennium has been increased from $1,500 to $2,500 and from $3,000 to $5,000 for cooperative stream measurements. This will vitally supplement the funds of other cooperating organizations.

MARCH 1 SNOW SURVEY DATA

1. UPPER HUMBOLDT BASIN

Temperature departure Nov.-Feb. Elko (5,077 ft.) -5.9°F.

Mean temperature above freezing +1.6°F.

	Elevation feet	Date	Snow depth inches	Density percent	Water equivalent	Normal water equivalent March 1	Percentage of Mar. 1 normal		Seasonal precipitation percentage of normal at U.S.W.B. stations Nov.-Feb.
Northern Feeders									
Marys River									
Bear Creek	8,100	Mar. 3	59.1	22.7	13.4	20.6	65.0	63.6	
Fox Creek	6,900	Mar. 4	29.2	23.6	6.9	11.1	62.2		Jarbidge-Mala Vista (6,100-5,585 ft.) 6.26 in.
Marys River	8,000	Not taken				20.3			
Marys River-North Fork									
Big Bend	6,800	Mar. 1	28.3	28.6	8.1	12.1	66.9	69.3	
Gold Creek	6,600	Mar. 1	21.7	28.9	6.3	8.6	71.7		
North Fork									
Jack Creek	7,800	Mar. 1	33.3	32.1	10.7	11.6	92.2		North Fork-Tuscarora-Owyhee- (6,500-5,400 ft.) 91.7
Jack Creek	7,000	Mar. 2	19.9	33.2	6.6	7.3	90.4	79.0	
Rodeo Flat	7,000	Mar. 2	31.5	31.8	10.0	14.3	70.0		
Fry Canyon	6,800	Mar. 3	29.5	29.2	8.6	13.6	63.2		
Tremewan Rch.	5,600	Mar. 2	7.5	29.3	2.2	4.0	55.0		
Susie-Maggie Creeks									
Taylor Canyon	5,200	Mar. 3	23.6	32.2	7.6	7.7	98.7		Tuscarora (6,400 ft.) 86.7

AVERAGE OF NORTHERN FEEDERS

Higher Levels 77.6

Lower Levels 55.0

91.7

MARCH SNOW SURVEY DATA

1. UPPER HUMBOLDT BASIN (Cont.)

	Elevation feet	Date	Snow depth	Density percent	Water equivalent	Normal water equivalent March 1	Percentage of March 1 normal		Seasonal percentage of normal at U. S. W. B. stations Nov.-Feb.
Southern Feeders									
Trout-Starr-Secret Creeks									
Trout Creek	8,500	Mar. 5	65.8	32.0	21.1	24.9	83.1		Arthur-Wells (6,500-5,633 ft.)
Trout Creek	6,900	Mar. 5	23.7	27.0	6.4	8.4	76.2	74.4	116.0
Dorsey Basin	8,100	Feb. 28	45.1	22.4	10.1	14.7	68.7		
Dry Creek	6,500	Feb. 28	18.8	30.8	5.8	8.3	69.9		
Ryan Ranch	5,775	Feb. 25	10.2	30.4	3.1	3.0	103.3		
Lamoille-Rabbit Creeks									
Lamoille	9,000	Mar. 4	72.1	30.6	22.1	24.1	91.7		
Lamoille	9,000+	Mar. 4	62.7	30.5	19.1	27.4	69.7		Lamoille-Elko (6,290-5,077 ft.)
Lamoille	8,500*							82.1	
Lamoille	8,100	Mar. 3	49.7	25.0	12.4	15.0	82.7		
Lamoille	7,600	Mar. 3	41.5	24.8	10.3	12.8	80.5		134.2
Lamoille	7,400	Mar. 1	38.1	27.6	10.5	12.2	86.1		

+ Cross Course

* Snow Course Destroyed by Avalanche.

MARCH 1 SNOW SURVEY DATA

1. UPPER HUMBOLDT BASIN (Continued)

Elevation feet	Date	Snow depth inches	Density percent	Water equivalent Mar. 1	Normal water equivalent Mar. 1	Percentage of Mar. 1 normal		Seasonal percentage of normal at U.S.F.B. stations Nov.-Feb.
Southern Feeders (Cont.)								
South Fork-Ruby Lake								
Corral Canyon 8,500	Mar. 4	67.3	26.9	18.1	14.5	124.8)		Hylton-Ruby Lake
Green Mountain 8,000	Mar. 3	47.9	27.6	13.2	17.3	76.3)		(7,081-6,200 ft.)
Harrison Pass 7,400 #2	Mar. 2	23.1	29.9	6.9)		)	94.4	
				)6.4	7.8	82.1)		
Harrison Pass 6,600 #1	Mar. 2	20.8	28.4	5.9)				
Hager Canyon 8,500	Mar. 7	59.5	28.6	17.0				
Cave Creek 7,000	Mar. 7	49.5	31.3	15.5				

AVERAGE OF SOUTHERN FEEDERS 128.1* Inc.

Higher Levels 88.0*
Lower Levels 103.3?

*The average for the Southern Feeders is computed by weighting the three groups of stations representing South Fork, Lamoille Creek, and Starr Creek on the basis of 2, 1, and 1/2 representing their relative contributions to the flow of the main Humboldt.

AVERAGE OF UPPER HUMBOLDT 109.9 Inc.

Higher Levels 82.8
Lower Levels 79.2?

MARCH 1 SNOW SURVEY DATA

11. LOWER HUMBOLDT BASIN

Temperature departure Nov.-Feb. Winnemucca +1.2°F.
Mean temperature above freezing +10.2°F.

	Elevation feet	Date	Snow depth inches	Density percent	Water equivalent inches	Normal water equivalent Mar. 1	Percentage of Mar. 1 normal		Precipitation (U. S. W. B. percentage of normal Nov-Feb.)
Rock Creek-Little Humboldt									
Midas	7,000	Mar.12	22.7	34.8	7.9				
Little Humboldt Basin									
Lamance Creek	7,000	Feb. 27	33.0	29.1	9.6	12.6	76.2		Paradise-Orovada
Granite Peak	8,600	Mar. 2	41.6	27.4	11.4	13.6	83.5		(4,650-4,300 ft.)
Martin Creek R.S.	7,000	Mar. 1	24.2	27.3	6.6	7.9	83.5	94.9	153.4
Upper Buckskin Mt.	8,200	Mar. 10	35.0	40.6	14.2	10.3	137.9		
Lower Buckskin Mt.	6,800	Mar. 10	31.2	28.2	8.8	9.4	93.6		
AVERAGE LITTLE HUMBOLDT BASIN								94.9	

Reese River Basin

Temperature departure Nov.-Feb. Austin -0.4°F.
Mean temperature above freezing +10.7°F.

Big Creek								
Cabin Course (Middle)		Mar. 3	19.9	23.1	4.6			
Big Creek Camp Ground (Lower)		Mar. 3	16.1	31.7	5.1			Austin (6,594 ft.)
Upper Big Creek	8,000	Mar. 3	36.4	25.8	9.4			
Reese River								103.3
Lower Corral	7,500	Mar. 2	11.9	29.4	3.5			
Upper Corral	8,500	Mar. 2	26.0	26.5	6.9			

MARCH 1 SNOW SURVEY DATA
EASTERN NEVADA

Temperature Departure Nov.-Feb. Ely (6,257 ft.) +0.9°F.
Mean temp. above freezing +8.5°F.

	Elevation feet	Date	Snow depth inches	Density percent	Water equivalent inches	Normal water equivalent Mar. 1 inches	Percentage of Mar. 1 normal	Precipitation (U.S.W.B.) percentage of normal Nov.-Feb.
Steptoe Valley								
Murray Summit	7,500	Mar. 1	14.2	32.4	4.6			Ely (6,257) 82.2
Baker Creek								
Baker Creek No. 3	9,250	Not taken						Lehman Caves Nat. Mon. (7,200 ft.)
Baker Creek No. 2	8,900	Mar. 1	64.9	22.3	14.5			
Baker Creek No. 1	7,950	Mar. 1	36.5	21.8	7.9			

SOUTHERN NEVADA

Temperature Departure Nov.-Feb. Las Vegas A. P. (1,876 ft.) +2.6°F; Kyle Can. R.S. (7,165 ft.)
Mean temp. above freezing 30.8°F.

Charleston Mt.								
Kyle Canyon	8,200	Feb. 26	33.9	29.2	9.9			Charleston R. S. (7,165 ft.)
Kyle Canyon	7,400							
Rainbow Canyon	7,800	Feb. 26	31.8	29.9	9.5			
Lee Canyon	9,000	Mar. 3	48.7	27.3	13.3			Las Vegas A. P. 52.2
Lee Canyon	8,300	Mar. 4	51.5	26.4	13.6			

WILDLIFE REFUGES

Sheldon National Antelope Refuge (Northern Washoe County)
Temperature Departure Nov.-Feb. -0.8°F.
Mean temp. above freezing +5.8°F. Inc.

Bald Mountain	6,720	Feb. 27	13.3	24.8	3.3			Sheldon Antelope Refuge (6,500 ft.) 111.6
Virgin	5,680	Not taken.						Cedarville (4,675 ft.)

MARCH 1 SNOW SURVEY DATA

Ruby Lake National Wildlife Refuge (Southern Elko County)

Temperature departure Nov.-Feb. Elko (5,077 ft.) -5.9°F. ; Ruby Lake (6,012 ft.)

Mean temp. above freezing +1.6°F.; Ruby Lake

	Elevation feet	Date	Snow depth inches	Density percent	Water equivalent	Normal water equivalent March 1	Percentage of Mar. 1 normal	Precipitation (U. S. W. B.) Percentage of normal Nov.-Feb.
Hager Canyon	8,500	Mar. 7	59.5	28.6	17.0			(Arthur 6,500 ft.) 95.3
Cave Creek	7,000	Mar. 7	49.5	31.3	15.5			Ruby Lake (6,200 ft.)

Comparison of March 1 Snow-Survey Data
1938-1945
Water Equivalent only

Courses	Elevation feet	1945	1944	1943	1942	1941	1940	1939	1938
1. Upper Humboldt Basin									
Northern Feeders									
Marys River									
Bear Creek	8,100	13.4	14.3	22.5	18.3	14.2	15.3	16.6	6.3
Fox Creek	6,900	6.9	9.5	9.6	9.8	7.6	5.7	8.7	7.2
Marys River	8,000		15.4	24.0	17.7		14.7	16.5	14.2
Marys River-North Fork									
Big Bend	6,800	8.1	6.4	16.3	10.2	9.9	6.4	7.2	8.2
Gold Creek R. S.	6,600	6.3	4.0	10.9	8.1	6.2	4.7	4.5	4.0
North Fork									
Jack Creek	7,800	10.7	9.4	12.3	11.5	9.4	8.9	12.9	4.5
Jack Creek	7,000	6.6	4.9	3.3	6.7	4.2	1.3	7.9	2.4
Rodeo Flat	7,000	10.0	10.1	12.5	11.4	10.5	7.5	11.0	6.5
Fry Canyon	6,800	8.6	8.2	10.7	10.5	9.2	6.5	10.0	7.2
Tremewan Ranch	5,600	2.2	2.9	2.3	4.1	3.2	0	2.4	0
Susie-Maggie Creek									
Taylor Canyon	5,200	7.6	4.2	4.4	8.5	8.3	3.0	5.6	4.9
Southern Feeders									
Trout-Starr-Secret Creeks									
Trout Creek	8,500	21.1	11.9	24.1	17.5	24.9	19.7	19.6	16.1
Trout Creek	6,900	6.4	0	4.8	9.0	6.5	7.4	5.0	6.5
Dorsey Basin	8,100	10.1	12.4	10.1	14.0	9.6	11.3	8.1	6.1
Dry Creek	6,500	5.8	5.9	4.8	7.6	6.6	3.2	3.6	5.8
Ryan Ranch	5,775	3.1	4.0	0.8	4.3	0.4	0.5	1.6	1.5
Lamoille-Rabbits Creeks									
Lamoille Canyon	9,000	22.1	21.7	31.6	23.8	22.7	20.4	23.4	19.0
Lamoille Canyon	9,000+	19.1	22.5	29.1	23.7	21.3	19.4	22.7	16.3
Lamoille Canyon	8,500		16.1	21.0	18.5	15.3	14.7		
Lamoille Canyon	8,100	12.4	13.0	13.7	13.3	11.2	11.8	12.6	10.7
Lamoille Canyon	7,600	10.3	10.5	12.0	12.7	9.4	9.1	9.4	9.2
Lamoille Canyon	7,400	10.5	9.3	11.7	12.4	10.2	7.4	8.6	8.9
South Fork-Ruby Lake									
Corral Canyon	8,500	18.1	16.2	15.8	15.8	13.2	14.4	16.1	11.3
Green Mountain	8,000	12.3	12.6	12.2	14.1	13.7	13.1	15.3	11.1
Harrison Pass #2	7,400	6.9	6.6	2.6	7.7	6.0	4.9	5.3	5.5
Harrison Pass #1	6,600	5.9	5.0	2.3	6.5	5.4	4.6	5.1	4.4
Hagar Canyon	8,500	17.0		19.1	21.0	14.8	19.3		
Cave Creek	7,000	15.5		14.6	16.2	0	12.4		

+ Cross Course

Comparison of March 1 Snow Survey Data
1938-1945 (Continued)

Courses	Elevation feet	1945	1944	1943	1942	1941	1940	1939	1938
2. Lower Humboldt Basin									
Rock Creek-Little Humboldt River									
Midas	7,000	7.9	4.8	5.2	9.2	7.3	5.2		
Little Humboldt Basin									
Lamance Creek	7,000	9.6	7.0	13.6	10.4	11.9	9.9	8.7	6.9
Granite Peak	8,600	11.4	7.4	18.9	13.7	15.7	15.0	12.8	13.5
Martin Cr. R.S.	7,000	6.6	3.8	9.5	8.3	7.8	6.8	5.8	8.1
Upper Buckskin	8,200	14.2		14.9	11.2	13.4	10.8	8.0	7.2
Lower Buckskin	6,800	8.8		9.3	7.6	8.4	5.8	6.7	8.1
Reese River Basin									
Big Creek									
Upper Big Creek	8,000	9.4	7.3	3.4	6.6				
Cabin Course (Middle)		4.6	1.4	1.0	4.9				
Camp Ground (Lower)		5.1	2.0	T	4.7				
Reese River									
Upper Corral	8,500	6.9	9.8	5.4	5.0				
Lower Corral	7,500	3.5	3.9	2.7	3.0				
3. Eastern Nevada									
Steptoe Valley									
Murray Summit	7,500	4.6	5.2	5.0	3.7				
Baker Creek									
Baker Creek #3	9,250			13.0					
Baker Creek #2	8,950	14.5	34.5	12.8	15.6				
Baker Creek #1	7,950	7.9	10.0	6.0	5.3				
4. Southern Nevada									
Charleston Mountain									
Kyle Canyon	8,200	9.9	12.9	15.7	8.8				
Kyle Canyon	7,400				5.4				
Rainbow Canyon	7,800	9.5	12.2	16.7	10.5				
Lee Canyon	9,000	13.3	8.9	17.4	9.9				
Lee Canyon	8,300	13.6	9.3	13.9	7.8				
5. Nevada Wildlife Refuge									
Sheldon Antelope Refuge									
Bald Mountain	6,720	3.3	3.4	7.7	6.2	5.9			
Mahogany Mountain	5,680		2.3	0.7	3.0	5.3			
Ruby Lake Wildlife Refuge									
Hagar Canyon	8,500	17.0		19.1	21.0	14.8			
Cave Creek	7,000	15.5		14.6	16.2	0			

WINTER PRECIPITATION
(U. S. Weather Bureau)

1. Upper Humboldt Basin

Northern Feeders	Marys River		North Fork		Maggie-Susie Creeks
Stations	Jarbidge	Mala Vista	North Fork	Owyhee	Tuscarora
Elevation (Ft. alt.)	(6,100)	(5,585)	(6,500)	(5,400)	(6,400)
November	1.95	1.33	1.43	1.80	1.71
December	1.77	0.76	0.57	1.11	0.50
January	1.35	0.15	0.20	1.20	1.37
February	3.90	1.32	1.35	1.59	1.64
Total	8.97	3.56	3.55	5.70	5.22
Weather Bureau Normal (Nov.-Feb.)			4.64	5.10	6.02
Seasonal Percentage of Normal			76.5	111.8	86.7
Area Percentage				91.7	
Northern Feeders			91.7		

Southern Feeders	Trout-Starr-Secret Creeks			Lamoille-Rabbit Creeks		South Fork	
Stations	Wells	Clover Valley	Arthur	Lamoille	Elko	Hylton	Ruby Lake
Elevation (Ft. alt.)	(5,663)	(5,800)	(6,500)	(6,290)	(5,077)	(7,081)	(6,200)
November	2.97	(closed)	4.06	5.34	2.19	(closed)	1.79
December	0.56		0.56	1.21	0.51		0.01
January	0.36		0.42	0.82	0.35	0.90 Inc.	0.05
February	1.62		1.99	2.74	1.67	1.30	
Total	5.51		7.03	10.11	4.72	2.20 Inc.	1.85 Inc.
Normal (Nov.-Feb.)	4.00	6.21	7.38	6.25	4.43	5.04	
Seasonal Percentage of Normal	137.8		95.3	161.8	106.5		
Area Percentage		116.6			134.2		
Southern Feeders			128.3*				

*See Footnote p. 6

WINTER PRECIPITATION

(U. S. Weather Bureau)

2. Lower Humboldt Basin

Stations	Paradise Valley	Orovada	Austin	Battle Mt.	Winnemucca	Rye Patch Dam	Lovelock
Elevation (Ft. Alt.)	(4,650)	(4,300)	(6,594)	(4,513)	(4,287)	(4,161)	(3,977)
November	2.29	2.68	2.13	1.54	1.77	1.56	1.33
December	0.87	0.73	0.56	0	0.53	0.43	0.06
January	0.83	1.38	1.07	0.63	1.27	0.73	0.52
February	2.22	1.56	0.66	1.33	2.75	1.99	1.88
Total	6.21	6.35	4.42	3.50	6.32	4.71	3.79
Normal (Nov.-Feb.)	4.10	4.09	4.28	2.54	3.70		1.71
Seasonal Percentage of normal	151.5	155.3	103.3	137.8	170.8		221.6
Area Percentage	153.4		103.3		154.3		221.6

	3. Eastern Nevada		4. Southern Nevada	5. Wildlife Refuges	
Stations	Ely	Lehman Caves Nat. Mon.	Charleston R.S.	Ruby Lake	Sheldon
Elevation (Ft. Alt.)	(6,257 ft.)	(7,200 ft.)	(7,165 ft.)	(6,200 ft.)	(6,500 ft.)
November	1.60	0	4.44	1.79	2.16
December	0.44	0.39	0.81	0.01	0.41
January	0.23	1.56	1.02	0.05	1.65
February	0.63		2.76		1.06
Total	2.90		9.03		5.28
Normal (Nov.-Feb.)	3.53				4.73
Seasonal Percentage of normal	82.2		(Las Vegas 52.2)	(Arthur 95.3)	111.6

WINTER RUNOFF 1942-1943-1944-1945 (Nov.-Feb.)
(Acrefeet)

Humboldt River at Palisade	1941-1942	1942-1943	1943-1944	1944-1945	Normal*
Nov.	10,997	5,530	3,280	3,780	4,600
Dec.	16,459	13,400	4,340	5,640	5,400
Jan.	16,500	35,880	4,100	6,920	6,600
Feb.	20,269	70,520	6,627	27,680	12,200
Tot.	64,275	125,330	18,347	44,010	28,800
	(223.2%)	(435.2%)	(63.7%)	(152.8%)	

Martin Creek at U.S. Gaging Point	1941-1942	1942-1943	1943-1944	1944-1945	Normal
Nov.	400 approx.	682		582	740
Dec.	500 approx.	1,140		538	750
Jan.	600 approx.	7,010		764	830
Feb.	800 approx.	6,090		4,000	1,380
Tot.	2,300 "	14,922	2,190	5,884	3,700
	(62.5%)	(405.5%)	(59.5%)	(159.9%)	

*37-year normal (adopted 1942)
** Normal Median 22,375 = 196.7%

WINTER TEMPERATURE DEPARTURE FROM NORMAL °F.

	Elko 1941-1942	Elko 1942-1943	Elko 1943-1944	Elko 1944-1945	Winnemucca 1941-1942	Winnemucca 1942-1943	Winnemucca 1943-1944	Winnemucca 1944-1945
Nov.	0.0	-1.1	-0.4	-10.9	+6.8	+1.4	+1.4	+1.5
Dec.	+ 4.7	+6.0	+4.0	-13.8	+5.0	+3.6	[illegible].5	0
Jan.	+ 0.8	+5.4	-9.5	- 1.1	-2.8	+3.4	-6.0	+0.2
Feb.	-5.5	+0.2	-2.3	+ 2.1	-1.9	+5.7	-1.6	+2.9
Average	0.0	+2.6	-2.0	-5.9	+1.8	+3.5	-0.9	+1.2

MEAN Max. TEMPERATURE DURING WINTER ABOVE 32°F (freezing)

	Elko 1941-1942	Elko 1942-1943	Elko 1943-1944	Elko 1944-1945	Winnemucca 1941-1942	Winnemucca 1942-1943	Winnemucca 1943-1944	Winnemucca 1944-1945
Nov.	+2.8	+3.0	+9.2	+2.8	+9.8	+7.8	+11.8	+10.4
Dec.	0	-0.2	+5.4	-8.5	+3.0	+1.6	+5.8	+ 8.5
Jan.	+3.1	-3.6	-1.2	+2.5	+3.7	0.0	+1.6	+ 8.6
Feb.	+3.2	-2.2	+3.2	+9.5	+9.2	+7.2	+4.4	+13.2
Average	+2.3	-0.8	+4.2	+1.6	+6.4	+4.2	+5.9	+10.2

WELL MEASUREMENTS

March 1

The March 1 level of the Humboldt Valley wells, though lower than during the years of 1942, 1943 and 1944, is considerably higher than in 1941, and of the Lamoille Valley wells seems to be at its highest since that date.

Taken individually, the low water levels of the Lamoille wells are all higher than in 1944 though with one exception lower than in 1942 and 1943. Furthermore, unlike 1941 all levels are above normal or average for 10 years.

Upper Humboldt Valley
(Average of 7 wells)*
11.62 ft.

To water level:

	7 wells	5 wells
1941	12.90 ft.	15.80 ft.
1942	9.19 "	11.20 "
1943	9.97 "	12.22 "
1944		10.50 "
1945	11.09 "	12.61 "

*For 1941 to 1944 approximately April 1

Lamoille Valley
(Average of 5 wells 4.24 ft.)

To water level:

1935	5.03 ft.
1936	3.72 "
1937	3.57 "
1938	4.50 "
1939	3.92 "
1940	4.50 "
1941	5.70 "
1942	3.80 "
1943	3.40 "
1944	4.14 "
1945	3.30 "

Low Water Departure from Normal in Lamoille Valley Wells

The Low-Water Departure from Normal of some of the Lamoille wells since 1935 has been prepared by H. P. Boardman in the following table. The table will ultimately include all of the wells of both valleys.

Lamoille Wells
Low Water Departure (ft.) from Normal (Avg. of 10 Yrs. '35-'44

Well	Depth	L.W. Normal	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945*
Charles	26.4	23.3	-3.1	-3.1	-2.2	+1.0	+2.3	+1.3	-2.7	+2.8	+3.3	+0.6	+2.2
Church	15.6	14.2	-1.4	-1.4	-1.4	-1.4	+2.2	-1.4	+1.2	+3.2	+2.7	+1.0	+1.5
Case	27.5	20.3	-7.2	-7.2	-1.7	-1.7	+3.8	+3.6	-7.2	+4.3	+9.8	+3.9	+7.0
Patterson	13.4	7.1	-5.5	-1.1	-1.6	-1.7	+2.4	-0.5	-0.4	*2.3	+3.6	+2.4	+2.9
McKinney Gate	4.5	2.9	0.0	-0.7	-0.6	+0.6	-0.4	-0.2	+0.9	-0.1	+0.4	+0.5	+1.5
Lytton Lane 1	5.1	4.5	-0.9	-0.2	-0.5	+0.8	+0.2	-0.3	+0.5	+0.1	+0.2	-0.3	+1.2
Lytton Lane 2	6.9	5.5	- 1.3	+ 1.0	-1.4	+0.4	-0.1	- 0.1	+0.9	+0.3	+0.3	+0.4	+1.4

*Provisional

NORMAL SUMMER RUNOFF

March - July
and March-September

	Upper Humboldt at Palisade (Acre Feet)		Martin Creek in Paradise Valley
	37 Yr. Average 1903/04-1939/40	Normal Median Adjusted 1903/06 and 1912/43	
Mch.	32,600	25,600	3,610
Apr.	47,200	39,700	6,330
May	54,500	51,000	6,530
June	60,400	70,500	2,950
July	20,300	16,500	900
Total	215,000	203,300	20,320
Aug.	3,600	2,200	620
Sept.	2,100	1,700	500
Mch.-Sept.	220,700	207,200	21,440

FORECAST

The final forecast of streamflow for the season must depend upon the two snow surveys of March 1 and April 1 which are designed to give the basic snow cover at the beginning of March, when the shallow snow of the Great Basin mountains begins to melt, and the residual snow cover at the beginning of April, which should indicate the probable span of streamflow. In the present or earlier bulletin, therefore, only the general forecast based on the initial snow cover will be made.

1. Factors

The chief factors upon which the general accuracy of the forecasts must be based are the snow cover (or winter precipitation) and the precipitation during the earlier portion of the period of runoff when the snow cover is most widely extended. The relative value of the two factors of total winter precipitation and snow cover residue has now become a problem of active discussion and investigation with very practical application in years like the present of wide divergence between them.

For the broad alluvial valley below the canyon outlets of the feeders, the height of the water table represents the relative capacity of the soil to hold snow-melt and the correction that should be made in the percentage represented by the snow cover.

2. Basic Data

The following basic data with adjustments in factors represent the trend and probable quantity of the runoff:

A. Precipitation and Snow Cover

I. Upper Humboldt Basin

(Percentage of Normal)

(a) Winter Precipitation and Snow Cover Mch. 1

Northern Feeders	Precip.	(Nov.Feb.)	91.7;	Snow Cover	(Mch.1)	77.6
Southern Feeders	"	"	128.1	"	"	88.0
	"	"	Inc.			
Upper Humboldt	"	"	109.9	"	"	82.6
			Inc.			

(b) Winter Runoff at Palisade 152.8; (Median 196.7)

Runoff approximately normal during Nov.-Jan. but double normal in Feb.

(c) Well Measurements (feet above normal)

Humboldt Valley +0.99 ft.
Lamoille Valley +0.94 ft.
Estimated effect at Palisade 10-15 percent of normal.

(d) Estimated March-July runoff at Palisade
82.8 percent expanded to 95.0 percent because of height of water table.
Normal 215,000 A.F. (Mean Median 203,300 A.F.)
Probable runoff (a) Mch.-July 200,000 A.F.;
(b) Mch.-Sept. 205,000 A.F.

II. Lower Humboldt Basin

(Percentage of Normal)

1. Little Humboldt
(a) Winter Precipitation and Snow Cover Mar. 1
Precip. (Nov.-Feb.) 153.4; Snow Cover (Mch. 1) 94.9
(b) Winter Runoff of Martin Creek 159.9
(c) Estimated Runoff Mch.-July 81 percent.
Normal 20,320 A.F. (Mch.-July); 21,440 (Mch.-Sept.).
Probable runoff Mch.-July 16,460 A.F; Mch.-Sept. 17,370 A.F.

2. Reese River
Winter Precip. (Austin) 103.3
Snow Cover approx. 20 percent greater than in 1944.

3. Storage above Lovelock.

Rye Patch Reservoir is full, a month early, at its capacity of 178,100 A.F.
The Pitt-Taylor Reservoirs now have 11,000 A.F. stored in a usable capacity of 37,000 A.F.

III. Eastern Nevada

The Nov.-Feb. precipitation at Ely is 82.2 percent of normal or 17 percent better than last year. But the snow cover is 12 percent less than a year ago.

IV. Southern Nevada

The precipitation at Las Vegas Airport for Nov.-Feb. has been 52.2 percent of normal, but the snow cover shows an average increase of 8 percent over last year.

V. Wildlife Refuges

1. Sheldon Antelope Refuge

The snow cover at Bald Mountain is practically identical in amount with last year, though packed to half the depth. The precipitation for Nov.-March was 111.6 percent of normal.

2. Ruby Lake Wildlife Refuge

The water content of the snow cover is approximately the same as in 1943 and the precipitation (Nov.-Feb.) as reported from Arthur is 95.3 percent of normal.

3. Accuracy of Forecasts 1943-44

(1) Upper Humboldt

The snow cover of the Upper Humboldt Basin on March 1 was 74.1 percent of normal. On March 1 and April 1 the water table as shown by by wells was slightly above normal and the winter runoff was 63.7 percent of normal despite a minus departure in temperature of 9° to 2°F in January and February. On the assumption that the excess effect of the water table should be at least 20 percent of normal the revised forecast of runoff at Palisade was set at 95 percent.

The precipitation during runoff was greatly deficient in March, May, and July but greatly in excess in April and June. For the period of March-June, when most effective, it totaled 143.0 percent of normal. The total excess due to rain on the basis of measurement in June 1913 was 20 percent.

The total runoff at Palisade March-July was 259,020 A.F. or 120.5 percent.

The data are summarized in the following table:

Snow Cover Mch. 1.....	74.1	percent
Water Table Mch. 1 and Apr. 1	20.0	"
Probable Runoff Mch.-July at Palisade.....	95.0	"
Effect of excess precip. Mch.-June on runoff.....	20.0	"
Probable Max. Runoff.....	115.0	"
Actual Runoff	120.5	"

(2) Martin Creek

A mystery enveloped the snow cover in Paradise Valley in the Little Humboldt Basin in 1944.

The snow survey at the headwaters of Martin Creek March 1 was 54.5 percent of normal but on April 1 was 90.8 percent and at Buckskin Mountain, not measured March 1, it was even 98.9 percent.

Last summer it was reported that precipitation of unusual intensity had fallen in that region during March. The total runoff, however, of Martin Creek during March-July was only 68.6 percent of normal.

It now appears that the precipitation for March as averaged for the two stations of Paradise Valley and Orovada on either side of the watershed was only 70.8 percent of normal but for April and June was greatly in excess of normal as in the Upper Humboldt. For the period of March-June, the total precipitation was 149.1 percent of normal, or on the basis of the Humboldt creatin an increase in runoff of 20 percent.

The data are as follows:

Snow Cover Mch. 1	54.5	percent
Precip. Nov.-Feb.	90.6	"
Probable Runoff	54.5	"
Effect of Excess Precip. Mch.-June on Runoff	20.0	"
Prob. Max. Runoff	75.0	"
Actual Runoff	68.6	"

Neither the precipitation of 90.6 percent of normal Nov.-Feb. nor the snow cover of 94.9 percent reported April 1 is harmonious with the runoff.

4. Preliminary Forecasts 1944-45

The preliminary forecasts for 1944-45 have been limited to Lamoille Canyon (7,400 ft.) in the Upper Humboldt Basin and Murray Summit (7,500 ft.) in Steptoe Valley of Eastern Nevada.

	Upper Humboldt Basin				Eastern Nevada		
	Depth (in.)	Density (%)	Water Equiv. (in.)	Pct. of Norm. Mch. 1	Depth (in.)	Density (%)	Water Equiv. (in.)
Dec. 17	20.8	23.6	4.9	40.2			
Jan. 1	25.3	23.7	6.0	49.2	12.5	21.6	2.7
Feb. 11	30.8	28.6	8.8	71.9	13.4	23.1	3.1
Mar. 1	38.1	27.6	10.5	86.1	14.2	32.4	4.6

APPRECIATION

Unusual effort was made by organizations and snow surveyors to obtain the measurements the present year despite lack of personnel and the heavy storm at the beginning of March.

Nevada Agricultural Experiment Station
March 13, 1945

J. E. Church

H. P. Boardman

Forecasters